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NOTES ON THE ANALYSIS OF EXPECTED AND REALIZED MONETARY FLOWS¹⁾

By Masao Baba*

Albert G. Hart analyzed the relationships between expected and realized payments or receipts in an appendix to his book, *Money, Debt, and Economic Activity*²⁾ by the same method as that of Erik Lindahl in his *Studies in the Theory of Money and Capital*.³⁾ The main device of the method is to subtract an *ex-post* equation from the *ex-ante* equation and thereby explain the sources of disagreements between prospective and retrospective values. The attempts to discover the sources of these "realized surprises," as it were, seem to have theoretical and practical significances. In the first place, they will show how "decisions will in fact be modified after a short interval in the light of their own collective consequences" and thus will "build up a chain of situations growing one out of another and representing a process in time"

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1) This paper is the abridged translation of my article in *Keizai-Ronso*, Vol. 70, No. 3, September, 1952 (in Japanese), which was written in summer of 1951.

2) New York, Prentice-Hall, 1948.

3) London, George Allen and Unwin, 1939 ("Algebraic Discussion of the Relation between some Fundamental Concepts" in Part I).

(The second stage of Shacklian economic analysis).⁴⁾ This seems to be the most fundamental problem of economic dynamics. In the second place, if this analysis is applied to the flows of consumer's payments, it will offer some suggestions for policy-making on the excess demand or supply in the consumption market.⁵⁾

Hart's method, however, seems to be unsatisfactory for the analysis of realized surprises and involve an ambiguity in its conclusions, which is only a natural consequence of the nature of his equations being definitional identities in the sense of book-keeping. This paper is intended to clarify this point and then make some comments on the method of Hart as well as Lindahl.

I

Suppose the most simplified model economy in which there are a household sector (h) and a business sector (e) but neither banking activities nor public authorities. Then we may safely assume that the total cash balance in the economy is always constant. In order to analyze the various items to appear in the combined cash accounts of sectors, we shall define the following notations which are very similar to those of Hart:

1. M : Total cash balance.
 G : Cash paid for goods and services.
 D : Cash paid for dividends and other profit distributions.
 F : Cash paid in financial transactions.
2. These symbols mean the *ex-ante* values, whereas a bar on top of each symbol means its *ex-post* value.
3. The subscript h or e on the right hand side of each symbol means the sector referred to.
4. If two subscripts are attached to G , D and E , the first one means the receiving sector, and the second means the paying sector.
5. M means the total cash balance at the beginning of a period

4) G. L. S. Shackle, *Expectation, Investment and Income*, London, Oxford University Press, 1938, pp. 1—2. The first stage of Shacklian economic analysis is "taking the sets of expectations held by different individuals at one moment as given, assigning specific values to certain variables, and assuming certain inherent characteristics of the economy, to show what decisions will be taken at this moment and what will their immediate consequences, before they are themselves modified in the light of their first effects" (p. 1). "For the first of these Mr. Keynes and those who have contributed suggestions to his work have provided as with a radically new line of attack. So far, however, he has not made us of it to penetrate the second stage," (p. 2). Also see J. R. Hicks, "Gleichgewicht und Konjunktur," *Zeitschrift für Nationalökonomie*, Bd. IV, Heft 4, Juni, 1933, S. 445.

5) Cf. E. Lindahl, "Swedish Experience in Economic Planning," *The American Economic Review*, Papers and Proceedings, May, 1950, P. 16.

and M' is the one at the end of the period.

6. "p" ("r") attached to the left side of each symbol means the anticipation of paying sector (or receiving sector). This distinction is not necessary for M nor for *ex-post* values.

In terms of those notations, the *ex-ante* combined cash account of business sector may be expressed as follows:

$$(I) \quad Me + rGeh + rGee + rFeh = pGhe + pGee + pDhe + pFhe + M'e.$$

This represents the prospective flows of payments and receipts from the viewpoint of business sector.

The sources of business surprises which Hart asked are the conditions "under which receipts from sales on consumption markets can aggregate more or less than business men expect."⁶ For the following arguments, it is convenient to rewrite (I) as follows:

$$(I') \quad rGeh = pDhe + pGhe + pGee - rGee + pFhe - rFeh + Me - \bar{M}e.$$

We should not hastily conclude here that for the above-mentioned purpose we have to subtract from (I') an *ex-post* equation corresponding to (I') and compare each *ex-ante* item with its corresponding *ex-post* one. This is not the case. What will the household sector experience in relations to the behavior of business sector? The monetary experience of household sector will be indicated by the following *ex-post* cash account equation:

$$(II) \quad \bar{M}h + \bar{G}he + \bar{D}he + \bar{F}he = \bar{G}eh + \bar{F}eh + \bar{M}'h.$$

Paying our attention to the purchasing activity of household sector, we may rewrite (II) as

$$(II') \quad \bar{G}eh = \bar{G}he + \bar{D}he + \bar{F}he - \bar{F}eh + \bar{M}h - \bar{M}'h.$$

The difference between (I') and (II') may be interpreted as indicating the direction and the quantitative degree of realized surprises in the receipts of business sector. Subtract (II') from (I').⁷ And if the difference is positive, it means the shortage of purchasing power, and the business sector will experience an unpleasant surprise.

$$(III) \quad rGeh - \bar{G}eh = pGee - rGee + (pGhe - \bar{G}he) - (rFeh - \bar{F}eh) \\ + (pFhe - \bar{F}he) + (pDhe - \bar{D}he) + (Me - \bar{M}e) + (\bar{M}'h - \bar{M}h).$$

As for this equation (III), Hart thinks that every terms on the right side constitutes a source of realized surprises in receipts of business sector. Let us assume that one or some terms in equation are positive and all the

6) Hart, "Failure and Fulfilment of Expectations in Business Fluctuations," *Review of Economic Statistics*, Vol. XIX, No. 2, May, 1938, P. 70.

7) It may be pointed out that this procedure is equivalent to that of the budgetary control in business management.

other terms are zero and then ask what such positive terms mean. If, for instance, $(\bar{F}eh - rFeh) > 0$, and all the other items in parentheses are zero, it means that the *ex-post* borrowing is greater than the anticipated amount of borrowing, and the discrepancy is equal to $(rGeh - \bar{G}eh) > 0$. Then Hart concludes that the actual receipts of business sector will tend to be short of the anticipated receipts.

Take another example, and suppose that the last two terms only are positive. Then we might say that the business sector experiences an unpleasant surprise to the extent that its planned increase of cash holding does not coincide with the planned change in the cash balance on the part of household sector. These concluding remarks of Hart are, however, not necessarily definitive at all. To point this out, let us transform the last two terms as follows:

$$\begin{aligned} & (Me - \bar{M}e) + (\bar{M}'h - \bar{M}h) \\ &= Me - [(\bar{M}e + \bar{M}h) - \bar{M}'h] \\ &= Me - \bar{M}'e. \end{aligned}$$

Here $(Me - \bar{M}'e > 0)$ is interpreted as meaning that the amount by which the business sector miscalculated its own cash balance shows up as the shortage of actual receipts. But it is perfectly justified to interpret the same equation as implying that because of the actual receipts in short of the anticipated receipts, the cash balance $\bar{M}'e$ was reduced to the amount less than Me . This interpretation seems appropriate if we remember that $\bar{M}'e$ is a residual item in book-keeping. Similar considerations can rightly be made for the other items. Generally speaking, there is no reason to believe that the items on the right hand side of equation are the causes to determine the term on the left hand side.

Hart interpretes $(pGee - rGee) > 0$ for instance that "receipts *will tend to* fall short of estimates to the extent that inter-business purchasers estimate transactions higher than inter-business sellers."⁸⁾ He was careful enough of his wording in saying "will tend to." Hart concludes that "the most that we know definitely from this kind of analysis, running in terms of truisms based on accounting definitions, is that *statements inconsistent with the truisms must be false*. But this is actually a good deal of knowledge."⁹⁾ But we must also add that a good deal of knowledge as Hart points out indeed involves very indeterminate and ambiguous knowledge, and that many of such informations could be interpreted in several ways.

8) Hart, *Money, Debt, and Economic Activity*, P. 535. My italics.

9) Hart, *ibid.*, P. 536. Author's italics.

II

The distinction between *ex-ante* and *ex-post* concepts is particularly useful when the plans made at the beginning of a period are not changed throughout the period.¹⁾ For this purpose it is necessary to choose the length of period sufficiently short²⁾ to satisfy this condition. Then the range in which estimates vary as time passes by³⁾ may be ignored and the values of all items may be treated as single-valued though they may in fact be many-valued. Thus the economic behaviors of business and household sectors can be regarded as conditioned by the fixed budget equations as we have done above.

In order to pursue the analysis of monetary flows further, we can not avoid the problem of pricing process within such theoretical framework. Hart said nothing about this problem. Lindahl,⁴⁾ whom Hart followed, assumed no change in prices within one period. At the opening of one period, all the prices are known according to which all households and firms make up the plans most favorable for them. These prices are supposed to be offered by a group of people and accepted by the others. The revision of those prices are, therefore, unseparably combined with the change of their general planning. In this case the dates when expectations and plannings are changed are those in which the formation of new prices take place. Lindahl assumes that the change of planning is made discontinuously so that the prices also jump up and down the rift between one period and another.

This assumption of Lindahl is very unrealistic. For instance, the sellers who accept the offered prices must decide the amount of supply curves.⁵⁾ This will imply that even if they want to offer the lower prices, they have to satisfy themselves in that unfavorable situation. If, however, the economic system involves monopolistic elements, the restrictions may not be too great. And yet another problem remains.

Let us come back to equation (III) in section II. After the settlement of accounts indicated by (III), the realized surprises will change the prices

1) Cf. Tord Palander, "Om 'Stockholmsskolans' begrepp och metoder", *Economisk Tidskrift*, Arg. XLIII, N:r 1, Mars, 1941, sid. 126.

2) For more discussion, see Lindahl, *Studies in the Theory of Money and Capital*, PP. 53 ff.

3) Cf. Hart, *Anticipations, Uncertainty, and Dynamic Planning*, *The Journal of Business* of the University of Chicago, Vol. XIII No. 4, Oct. 1940, PP. 52—53. Also see J. Mars, "A Study in Expectations: Reflections on Shackle's 'Expectation in Economics,' Part I," *Yorkshire Bulletin of Economic and Social Research*, Vol. 2, No. 2, July, 1950, P. 92 (Diagram XIII).

4) Lindahl, *ibid.*, PP. 60 ff.

5) Cf. H. Aoyama, "Period Analysis and Equilibrium" (in Japanese), *Keizai-Ronso*, Vol. 50, No. 4, April, 1940.

offered in connection with the subsequent revision of anticipation and planning. In this case we have also to consider the inventory policy of the business sector.⁶⁾ Not only the prices but also the inventories will be changed to diminish the extent of unpleasant surprises or to increase that of pleasant surprises. This Procrustean process of inventory policy in the business sector will be subject to the existing amount of inventories. Even though there exist enough inventories, the business sector may not decumulate them, for instance, in the inflationary process. Then, the purchase planned by the household sector will never be realized. In this case, whatever plans the household sector makes, it is bound to purchase the amount of goods offered by the business sector at the prices offered by the monopolistic firms. The *ex-ante* figures of various items in the business sector's budget drawn at the beginning of one period are "anticipated *ex-post* figures,"⁷⁾ as it were, and they are to materialize themselves in the process of the economy where the above-mentioned pricing process and inventory policy are assumed. If we strictly follow the theoretical implications of Lindahl-Hart method of analysis, the exposition like the one above seems unavoidable, and this does indeed lead to the pessimistic conclusion that there is no need to differentiate between the *ex-ante* and the *ex-post* values in such analyses.

III

Thus far we made no distinction between Hart's and Lindahl's methods. As we discussed above, Hart used the cash account for his method, whereas Lindahl discussed the problems in terms of income accounts. J. M. Keynes, D. H. Robertson and many others also analyzed the monetary flows by means of income accounts. It should be kept in mind, however, that this procedure involves an ambiguity to analyze the symptomatic sources of surprises. For income accounts would involve the depreciation allowance which necessarily extends the scope of the accounts to the future. Without involving elements of expectation the depreciation allowance could not be esti-

6) "With aggregate receipts from sales just as expected, some firms observing their particular markets weaker than expected might reap larger-than-expected receipts by selling off inventories at prices lower than they had expected to charge. If so, they would be unpleasantly disappointed as to markets but not as to receipts. But their sales, draining receipts away from other firms, would give the other firms unpleasant surprises both as to receipts and as to markets." (Hart, *Money, Debt, and Economic Activity*, footnote in P. 222.)

7) This expression has been coined by J. G. Koopmans (G. Stuvell, *Recent Experience in the Use of Social Accounting in the Netherlands*, Papers prepared for the 1949-Meeting of the International Association for Research in Income and Wealth held at Cambridge, England, [mimeographed]).

mated.¹⁾ Clearly we cannot allow for depreciation where capital becomes obsolete because this method distorts the income accounts. We have to consider the depreciation allowance either as final whenever it is estimated or as a unilateral transaction so as to be figured in cash account. Hart adopted the latter method.

If we accept this method of Hart, then we must also reconsider the contents of the so-called cash accounts. There does not seem to be good reasons that the inflows and the outflows of money in cash accounts be limited to the simultaneous exchange of money with goods, services, and securities. Credits sales or purchases for instance are to be considered as the receipts or payments in the future. Furthermore we may include the transfer transactions. The concept of cash transactions may be extended to include those in exchange of checks to receive, remittance bills, monetary orders, and so on. If we broadened the frontiers of cash accounts, we would have to assume that all households and firms register the cash journals and then enter all the terms into the cash accounts. Then the cash accounts would describe all the transactions and therefore the total monetary flows in the economic system. We lose indeed nothing for the calculation of cash balance by assuming this procedure in constructing are combined cash accounts for economic analysis.

1) Cf. Hart, "Failure and Fulfilment of Expectations in Business Fluctuations," (P. 70) and Bertil Ohlin, "Some Notes on the Stockholm Theory of the Saving and Investment" (in *Readings in Business Cycles Theory*, Philadelphia, Blakiston, 1944).